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Inventor : Manders et al.

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For : OPEN ROOF ASSEMBLY FOR A  
VEHICLE, AND FRAME PART FOR  
APPLICATION THEREIN

Group Art Unit: 3612

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Docket No.: I07.12-0090

**CLAIM OF PRIORITY AND TRANSMITTAL OF  
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Sir:

Applicant claims right of priority under the provisions  
of 35 USC § 119 based on German Patent Application No. 103 03  
770.5, filed January 30, 2003.

A certified copy of this application is enclosed. This  
priority application is identified in the Declaration filed  
January 26, 2004.

Applicant requests that priority be granted on the  
basis of this application.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By:

Steven M. Koehler, Reg. No. 36,188  
Suite 1600 International Centre  
900 Second Avenue South  
Minneapolis, Minnesota 55402-3319  
Phone: (612) 334-3222 Fax: (612) 334-3312



## Prioritätsbescheinigung über die Einreichung einer Patentanmeldung

**Aktenzeichen:** 103 03 770.5

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**Anmelder/Inhaber:** Inalfa Roof Systems Group B.V., Venray/NL

**Erstanmelder:** Inalfa Industries B.V., Venray/NL

**Bezeichnung:** Open roof assembly for a vehicle, and frame  
part for application therein

**IPC:** B 60 J, B 60 R

Die angehefteten Stücke sind eine richtige und genaue Wiedergabe der ursprünglichen Unterlagen dieser Patentanmeldung.

München, den 22. Januar 2004  
Deutsches Patent- und Markenamt  
Der Präsident  
Im Auftrag

Klostermeyer

Open roof assembly for a vehicle, and frame part for application therein

Firstly, the invention relates to an open roof assembly for a vehicle, comprising a roof opening provided in the roof of the vehicle and a closure means movable relative to the roof opening for opening and closing the latter, wherein the roof opening is surrounded by a frame connected to the roof of the vehicle, which frame at least comprises two guides extending along opposite longitudinal edges of the roof opening for cooperation with the closure means, and drain channels extending substantially along all edges of the roof opening.

The frame of such an open roof assembly comprises several parts, such as the two guides and the drain channels. During assembly of the open roof assembly these parts are joined to create the frame that has to be connected to the roof of the vehicle. In corner areas of the frame preferably plastic materials are used, which should have specific adhesive properties, thus decreasing the choice of plastic materials. Further, due to the ever increasing complexity of open roof assemblies of the type referred to above, the demands on the parts of such an open roof assembly, especially the frame parts, will increase. Finally, while joining the separate parts of the frame special care should be taken for obtaining a proper sealing between the parts.

It is an object of the present invention to provide an improved open roof assembly of the type referred to above.

Thus, in accordance with the present invention there is provided an open roof assembly for a vehicle, comprising a roof opening provided in the roof of the vehicle and a closure means movable relative to the roof opening for opening and closing the latter, wherein the roof opening is

surrounded by a frame connected to the roof of the vehicle, which frame at least comprises two guides extending along opposite longitudinal edges of the roof opening for cooperation with the closure means, and drain channels extending substantially along all edges of the roof opening, characterized in that the drain channels are integrally combined into one single frame part, wherein said frame part comprises receiving recesses for housing the two guides.

Because the drain channels are integrally combined into one single frame part the problems originating from joining separate parts are greatly eliminated. Such a single frame part, which substantially is constituted by the drain channels, is self-supporting. During assembly of the open roof assembly only the guides should be inserted into the receiving recesses. An additional advantage is provided in that the guides will be positioned in a dry region of the open roof assembly.

In accordance with a preferred embodiment of the open roof assembly according to the invention, the receiving recesses of the frame part are shaped as gutters engaging the guides substantially at the bottom side and at the two lateral sides.

As a result the gutters substantially surround the guides, especially at the lower part thereof, such that separate sealing means between the guides and the frame part are not necessary. Moreover an effective connection between the guides and the frame part is realised. As a result, the guides obtain a stable position on the frame part.

Further it is possible, that the drain channels extending along the transversal edges of the roof opening bridge the gutters and the guides received therein.

The transversally extending drain channels (forward drain channel and rearward drain channel) not only bridge the guides received in the gutters, but also prevent these from moving upwards out of the receiving recesses

(gutters). Thus, the bridging parts of the transversally extending drain channels define a fail-safe feature which comes into effect when the connection between the guides and the gutters should fail.

5 Further, preferably the receiving recesses and guides are provided with cooperating fixing means for detachably connecting the guides to the recesses. Such cooperating fixing means could, for example, comprise snap means known per se.

10 Further an embodiment is mentioned, wherein the frame part comprises provisions for a connection thereof to the roof of the vehicle. Such provisions could comprise extensions of the frame part provided with holes for receiving screws, bolts or alike for a connection to the roof of the  
15 vehicle. However, the frame part also could comprise provisions for a connection thereto of other parts belonging to the open roof assembly, such as for example a sun screen assembly, a driving assembly or a control unit.

In still a further embodiment of the open roof assembly according to the invention the frame part is provided  
20 with a cover or covers for covering selected areas of the frame part such as, for example, channels for driving cables or alike.

Often an open roof assembly of the type referred  
25 to above comprises channels for driving cables for driving the closure means. The cover or covers then could cover such channels. However, also other parts of the frame part could be covered by such cover or covers.

In a second aspect the present invention relates  
30 to a frame part for application in an open roof assembly according to the present invention.

Hereinafter the invention will be elucidated referring to the drawings, in which an embodiment of the open roof assembly according to the invention is illustrated.

Figure 1 shows perspectively a frame part for application in an open roof assembly according to the invention, partly disassembled, and

5 Figure 2 shows, on a larger scale, a detail of the frame part illustrated in fig 1.

Referring firstly to fig. 1, a frame is illustrated for surrounding a roof opening provided in the roof of a vehicle. The vehicle, its roof opening and a closure means movable relative to said roof opening for opening and  
10 closing the latter, are not shown.

Still referring to fig. 1, the frame basically comprises two drain channels 1, 2 extending longitudinally (i.e. lengthwise relative to the vehicle not shown). Further the frame comprises a forward drain channel 3 and a rearward  
15 drain channel 4 extending transversally. When the frame, as is known per se, has been mounted around the roof opening of the vehicle said drain channels 1-4 are positioned along the corresponding edges of the roof opening for collecting water (e.g. rain water) entering the roof opening.

20 Further, near to its rearward drain channel 4, the frame is provided with mounting means 5 for a winding mechanism for a sunscreen (not shown in detail) or other parts. Such a winding mechanism or other parts are known per se, and their details are not relevant for the present invention.  
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The frame as illustrated in fig. 1 and fig. 2 further comprises at least two guides extending along the opposite longitudinal drain channels 1, 2 (and thus along opposite longitudinal edges of the roof opening not shown) for  
30 cooperation with the closure means, as is known per se. In fig. 1 and fig. 2 the guides are not yet present in the frame, but will be applied in a manner to be described below.

Finally, the frame is provided with provisions 6  
35 for a connection thereof to the stationary roof part of the

vehicle. Such provisions may, for example, comprise extensions of the frame body provided with holes for receiving screws or bolts to be attached to the stationary roof part of the vehicle. However, also other appropriate means for  
5 obtaining a connection between the frame and the stationary part of the roof of the vehicle may be applied.

The longitudinal drain channels 1, 2 and forward drain channel 3 as well as rearward drain channel 4 are integrally combined into one single frame part. Thus, the  
10 frame already obtains its structural integrity by means of said drain channels.

Now reference is made to fig. 2 which shows, on a larger scale, a detail of the frame illustrated in fig. 1. Fig. 2 shows one longitudinal drain channel 1, the forward  
15 drain channel 3 and rearward drain channel 4. Further, part of the mounting means 5 for a sunscreen or other part and some of the provisions 6 for obtaining a connection with a stationary part of the vehicle, are illustrated.

The frame part comprises gutters 7 which define  
20 receiving recesses for housing guides. One such guide is illustrated at 8, and can be slid into the gutters 7 as indicated by arrow 9. These guides 8 cooperate with corresponding slide shoes or alike of a closure means not illustrated for closing and opening a roof opening which is surrounded  
25 by the frame.

The gutters 7 are shaped such that they engage the guides 8 (when applied in the gutters) substantially at the bottom side and at the two lateral sides. As a result a stable positioning of the guides 8 within the gutters 7 is obtained. Further, but not shown, the gutters or receiving recesses 7 and guides 8 may be provided with cooperating fixing means (such as, for example, snap means) for detachably  
30 connecting the guides 8 to the recesses 7.

As mentioned before, the longitudinal drain channels 1, 2 and forward and rearward drain channels 3 and 4,  
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respectively, are integrally combined into one single frame part. Because, however, the guides 8 have to be slid longitudinally into the gutters 7, the forward drain channel 3 and rearward drain channel 4 bridge the gutters 7 (and the guides 8 received therein). Bridging sections 10 and 11 of the forward drain channel 3 and rearward drain channel 4, respectively, are indicated in fig. 2. These bridging sections 10, 11 also assist in maintaining the guides 8 at the desired location within the gutters 7.

When comparing the forward drain channel 3 with the rearward drain channel 4, it appears that the forward drain channel 3 is deeper than the rearward drain channel 4. This is because the rearward drain channel 4 should leave enough space for the passage of a sunscreen.

Rearward drain tubes 12 directly connect to the longitudinal drain channel 1, 2. Forward drain tubes 13 directly connect to the forward drain channel 3. Water entering the rearward drain channel 4 flows over the bridging sections 11 thereof into the longitudinal drain channels 1, 2. Water entering the forward drain channel 3 will not pass the bridging sections 10 (because these are elevated relative to the remainder of the bottom of the forward drain channel 3) and will leave the frame through the forward drain tubes 13.

What is not shown is, that the frame part may be provided with a cover or covers for covering selected areas of the frame part, such as for example channels for driving cables or alike. Such channels could be provided within the guides 8 or within the frame itself.

The invention is not limited to the embodiment described before which may be varied widely within the scope of the invention as defined by the claims.



## CLAIMS

1. Open roof assembly for a vehicle, comprising a roof opening provided in the roof of the vehicle and a closure means movable relative to the roof opening for opening and closing the latter, wherein the roof opening is surrounded by a frame connected to the roof of the vehicle, which frame at least comprises two guides extending along opposite longitudinal edges of the roof opening for cooperation with the closure means, and drain channels extending substantially along all edges of the roof opening, characterized in that the drain channels are integrally combined into one single frame part, wherein said frame part comprises receiving recesses for housing the two guides.

2. Open roof assembly according to claim 1, wherein the receiving recesses of the frame part are shaped as gutters engaging the guides substantially at the bottom side and at the two lateral sides.

3. Open roof assembly according to claim 2, wherein the drain channels extending along the transversal edges of the roof opening bridge the gutters and the guides received therein.

4. Open roof assembly according to any of the previous claims, wherein the receiving recesses and guides are provided with cooperating fixing means for detachably connecting the guides to the recesses.

5. Open roof assembly according to any of the previous claims, wherein the frame part comprises provisions for a connection thereof to the roof of the vehicle.

6. Open roof assembly according to any of the previous claims, wherein the frame part is provided with a cover or covers for covering selected areas of the frame

part such as, for example, channels for driving cables or alike.

7. Frame part for application in an open roof assembly according to any of the previous claims.

## ABSTRACT

An open roof assembly for a vehicle comprises a roof opening and a closure means. The roof opening is surrounded by a frame connected to the roof of the vehicle, comprising at least two guides extending along opposite longitudinal edges of the roof opening for cooperation with the closure means, and drain channels extending substantially along all edges of the roof opening. The drain channels are integrally combined into one single frame part, whereas said frame part comprises receiving recesses for housing the two guides.

